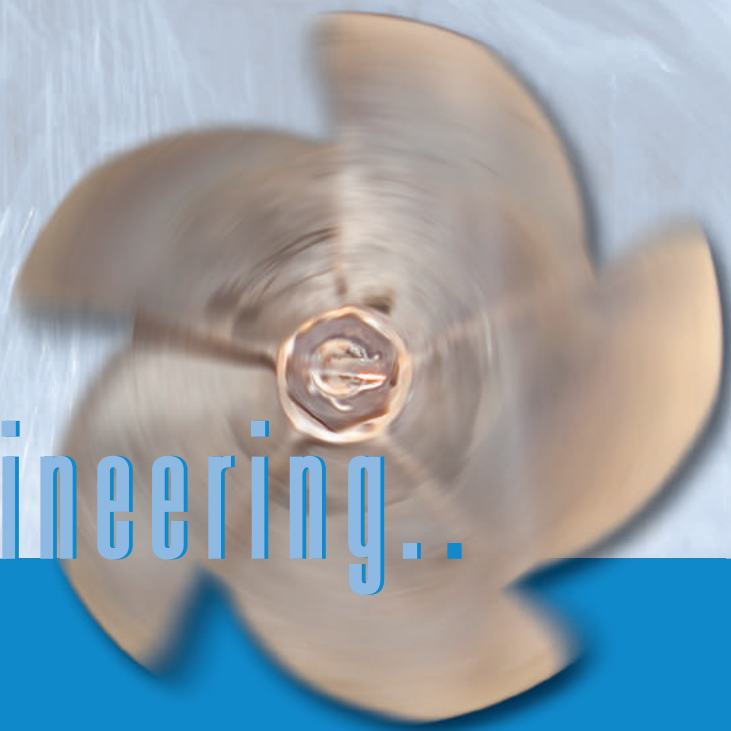




hydraulic engineering..



hydraulic engineering.





HYDRAULIC ENGINEERING

Getting to the bottom of it

Hydraulic engineering is counted among the internationally significant fields of activity in which the family-run company Felbermayr operates. To date, this strongly expanding company division has grown to include around 140 floating vessels and numerous push boats, which could be used to process virtually the whole of Europe's domestic water system. The multitude of services on offer ranges from classic dredging, ramming and drilling work, to planned excavation and bank protection work to stabilise the

water level. Moreover, general vessel transportation and route maintenance measures can also be implemented, for instance. But this strongly expanding field of work also includes the renting out of floating vessels. What's more, Felbermayr customers also benefit from the multitude of synergies to Felbermayr's other civil engineering divisions and to the business field of transport and lifting technology.



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At the international regatta centre in Ottensheim (Upper Austria), the stilted dredger pontoon Ludwig and the self-dumping barges were moved into position. They had to make the channel floor suitable for racing during the World Rowing Championships, which were about to take place. Thanks to an electronic system, the desired dredging depth can be complied with exactly and monitored on a screen.



DREDGING

Used to restore and preserve waterways

The removal of material from standing and/or flowing waters is counted among the most common tasks undertaken in hydraulic engineering. This work in the groundwater area calls for a preparatory examination and approval from expert individuals. When the work is being executed, specialist expertise, the use of a suit-

able vessel and consideration of environmental protection and defined conditions are key. The accumulating material can be used to add to the bed load or, provided that it is suitable for such a purpose, can also be recycled as a mineral material within structural or civil engineering applications.





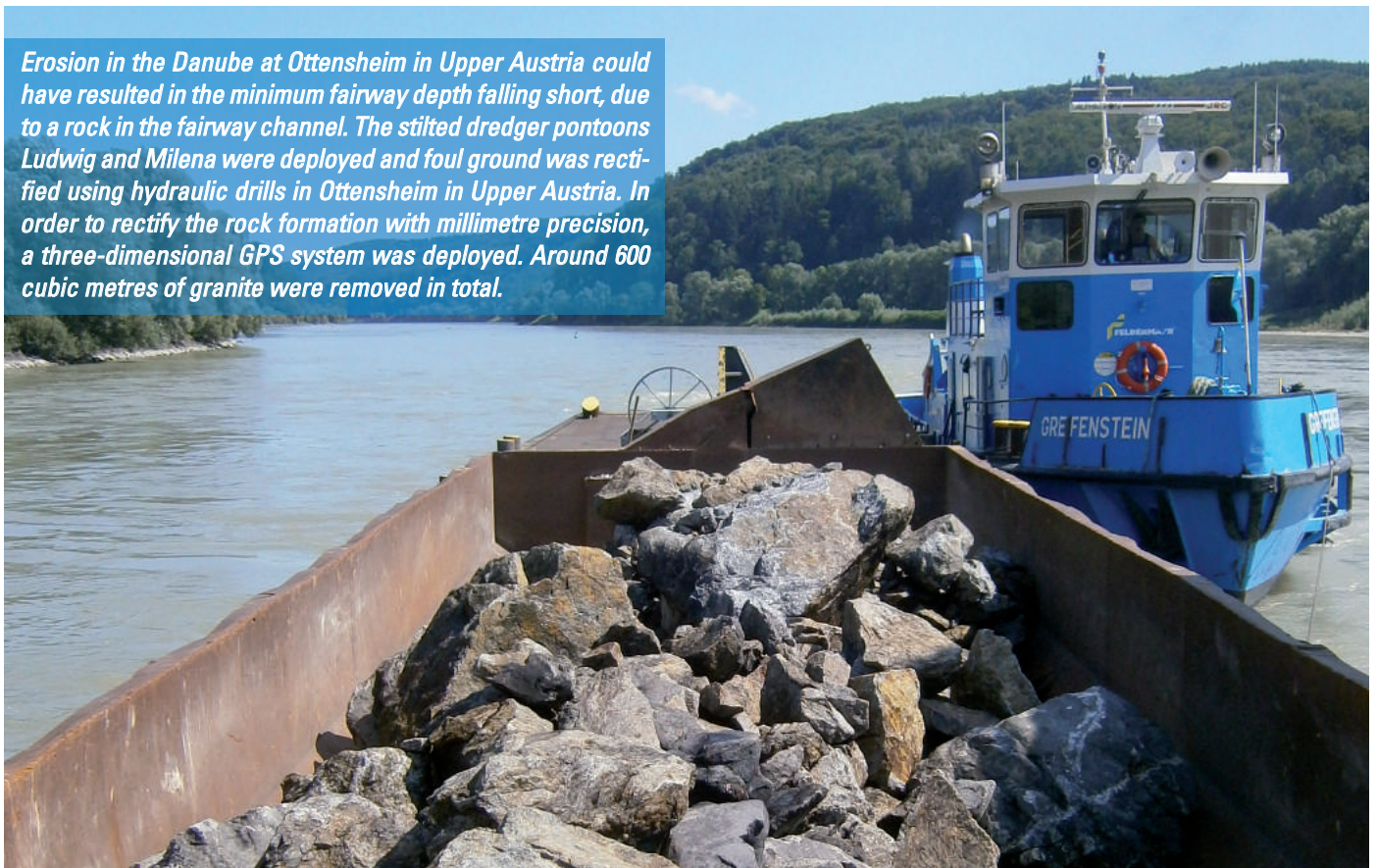
UNDERWATER DRILLING AND DEMOLITION WORK

Solutions tailored to water

If hydraulic power plants are opposed to harmless shipping companies or a planned construction project, we have the ideal vessel that can implement the necessary structural measures. Using a multitude of different hydraulic drills, we rectify any underwater rock formations. Combined with the vessel – which is optimised for underwater use – and our employees' know-how,

we efficiently disassemble even reinforced concrete structures, all the while taking into consideration the ecological framework conditions. If necessary, we also perform underwater demolitions and guarantee to transport away and recycle the accumulating construction residue.

Erosion in the Danube at Ottensheim in Upper Austria could have resulted in the minimum fairway depth falling short, due to a rock in the fairway channel. The stilted dredger pontoons Ludwig and Milena were deployed and foul ground was rectified using hydraulic drills in Ottensheim in Upper Austria. In order to rectify the rock formation with millimetre precision, a three-dimensional GPS system was deployed. Around 600 cubic metres of granite were removed in total.



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BANK PROTECTION WORK / BREAKWATER CONSTRUCTION

Biological engineering measures

One of the essential roles played by bank protection and breakwaters is protecting water shores from erosion. Bank protection can be designed as a simple riprap, but also as a mat. On shores that are at high risk of erosion, concrete bank protection sometimes needs to be set up.

Breakwaters serve to change the cross-section of a river and are set up in the midstream direction from the shore.

This increases the flow speed in the midstream, which also goes hand-in-hand with increased sediment removal to deepen the fairway channel. In contrast, the flow is slowed down in the boundary areas. This results in areas of slack water, which are frequently set up to restore sections of waters.



To restore the Danube's ecological balance in Hainburg (A), four breakwaters were set up in a new, flow-optimised shape during the course of a pilot project. The special feature here was that the breakwaters feature a flat design and are overflowed on the shore side even during low tide.



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RESCUE WORK

Quick and efficient help in maritime disasters

Forces of nature, low water levels or technical malfunctions can occasionally make rescue and lighterage deployments necessary. For services such as this, Felbermayr's Hydraulic Engineering division has a multitude of floating vessels, such as stilted

pontoons, long-arm excavators and motor boats. But also appropriate lifting vessels, such as work platforms and cranes, can be promptly deployed for rescue deployments and lighterage.



A motorised freighter that had run aground in Vienna's Freudenau power plant was lightened thanks to Horst Felix being deployed. To this end, around 400 tonnes of artificial manure had to be unloaded from the damaged ship to Horst Felix. Then, the motorised freighter was pulled into free water and the big packs were re-loaded with the cargo.

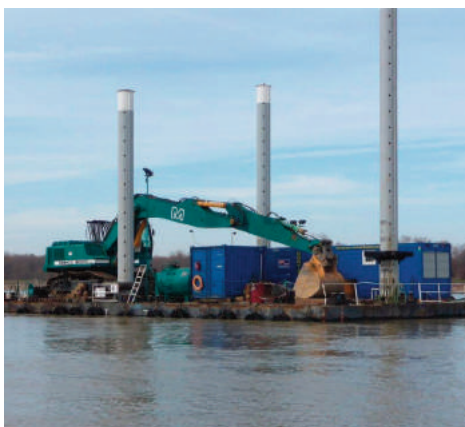


VESSEL-RELATED DEPLOYMENTS

Everything to do with water

In addition to the general areas of activity in hydraulic engineering, Felbermayr has also proven itself as being a strong partner in the sense of structural steel hydraulic engineering. Felbermayr's Hydraulic Engineering division is thereby also able to guarantee ramming work and on-water transportation of construction machines in a time- and cost-efficient manner.

The necessary conditions for this are created by (among other things) the pontoons, which can be disassembled and also transported by road. In addition to the technical possibilities, the employees of the Felbermayr Hydraulic Engineering division also have impressive knowledge in relation to civil engineering. Customer requirements can thus be optimally understood and implemented.



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The suction dredger belonging to the Felbermayr subsidiary Reinhold Meister Wasserbau was used in the storage room of the Rosegg-St. Jakob power plant. To deepen the water level from 3.5 to 6.5 metres, around 300,000 cubic metres of bed load was transported away. The job was completed in spring 2013.



RINSING AND SUCTION

A suction dredger: an individual deployed vessel

With an application depth of up to 20 metres, our suction dredgers are suitable for deployment in Europe's flowing waters in practically all areas of application. In addition, they can be disassembled thanks to their modular design and can thus be transported by road. They can therefore also be effortlessly deployed on lakes and smaller waters.

Suction dredgers are primarily used to remove mud, sand or gravel from the water bed. During this process, the material is taken up using a suction head and then transported away using a jet system. For tougher rocky formations, the cutting wheel can also be used as an alternative to the suction head.

The accumulating material is transported to the shore using a so-called floating pipeline.





SITES

Your project is in good hands

During spring 2012, in addition to further sub-divisions, Felbermayr acquired the Hydraulic Engineering and Culvert Construction divisions of the former Reinhold Meister Group, which is based in Hengersberg, Deggendorf. Felbermayr has thereby expanded its existing Hydraulic Enginee-

ring segment and tapped into a new area of activity. Considered from a geographical perspective, we're at home on all the waters in Europe. In this way, we are able to use our know-how to work on both flowing waters and inland lakes.

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